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## NOTES ON SHARKS.

BY HENRY W. FOWLER.

The species included in this paper are based on material contained in the collection of the Academy of Natural Sciences of Philadelphia, unless otherwise stated.

## HEXANCHIDÆ.

*Hexanchus griseus* (Gmelin).

A dried skin without data.

*Heptranchias cinereus* (Gmelin).

Head  $6\frac{2}{3}$  to  $6\frac{1}{2}$ ; depth 10 to  $10\frac{3}{4}$ ; snout 3 in head; eye 4 to  $4\frac{1}{2}$ ; length of mouth  $2\frac{1}{4}$  to  $2\frac{3}{4}$ ; interorbital space  $3\frac{1}{8}$  to  $3\frac{3}{4}$ ; front margin of first dorsal  $2\frac{3}{5}$  to  $2\frac{3}{4}$ ; front margin of anal  $3\frac{5}{8}$  to  $4\frac{7}{8}$ ; least depth of caudal peduncle 4; front margin of lower caudal lobe 2 to  $2\frac{1}{2}$ ; length  $32\frac{1}{2}$  to  $35\frac{1}{2}$  inches. Two examples from Italy (C. L. Bonaparte, No. 245).

Also 2 dried skins without data, the larger  $44\frac{1}{2}$  inches long.

## HETERODONTIDÆ.

*Heterodontus japonicus* (Duméril).

Head  $5\frac{1}{5}$ ; depth  $7\frac{1}{4}$ ; depth of head  $1\frac{3}{5}$  in its length; width of head  $1\frac{1}{5}$ ; height of first dorsal  $1\frac{2}{7}$ ; height of second dorsal  $1\frac{1}{2}$ ; height of anal  $1\frac{3}{5}$ ; lower caudal lobe  $1\frac{2}{7}$ ; pectoral  $4\frac{2}{5}$ ; tail  $4\frac{1}{8}$  in length of body; width of pectoral  $1\frac{1}{2}$  in its length. Color in alcohol deep brown with obscure scattered brown spots on trunk, which are however rather sparse. Length 28 inches. No data.

Also jaw of another, from Japan in 1891 (Frederick Stearns).

## SCYLIORHINIDÆ.

*Poroderma stellare* (Linnaeus).

Head  $7\frac{3}{7}$  to  $8\frac{1}{8}$ ; depth  $8\frac{3}{5}$  to 14; snout  $2\frac{1}{5}$  to  $2\frac{2}{3}$  in head; eye  $3\frac{2}{5}$  to  $4\frac{3}{4}$ ; width of mouth 2 to  $2\frac{2}{3}$ ; interorbital space  $2\frac{1}{8}$  to  $2\frac{3}{8}$ ; first dorsal  $1\frac{1}{3}$  to  $1\frac{7}{8}$ ; second dorsal  $1\frac{7}{8}$  to  $2\frac{1}{8}$ ; anal  $1\frac{3}{5}$  to  $2\frac{1}{4}$ ; caudal from origin of lower lobe  $3\frac{3}{5}$  to  $4\frac{3}{4}$  in rest of body; length 6 to 18 inches. Eleven examples. Italy (Bonaparte). Also 2 dried skins, Nos.  $\frac{89}{T}$  and  $\frac{83}{T}$ , with same data.

Two other dried skins without data.

This genus must now be known by the above name, as Dr. Gill's specification of *Catulus stellaris* Smith as the type of *Catulus*<sup>1</sup> is not admissible. Under *Catulus* three species are included by Smith, viz.: *Squalus canicula* Linn., *Scyl. marmoratum* Bennett, and *C. edwardii* Smith. The first of these is here considered as the type, thus allowing it to fall a synonym of *Scyliorhinus* Blainville. The type of *Poroderma* Smith may be considered its first species, *Squalus africanum* Gmelin.

*Galeus melastomus* Rafinesque.

Head  $6\frac{1}{5}$  to 7; depth 10 to  $14\frac{7}{8}$ ; snout 2 to  $2\frac{1}{8}$  in head; eye  $3\frac{1}{2}$  to  $4\frac{3}{8}$ ; width of mouth  $1\frac{9}{10}$  to  $2\frac{5}{8}$ ; interorbital space 2 to  $2\frac{3}{8}$ ; first dorsal  $1\frac{3}{8}$  to  $2\frac{1}{2}$ ; second dorsal  $1\frac{7}{8}$  to  $2\frac{3}{8}$ ; base of anal 1 to  $1\frac{7}{8}$ ; caudal from origin of lower lobe  $2\frac{1}{2}$  to  $3\frac{3}{8}$  in rest of body; length 7 to  $18\frac{7}{8}$  inches. Ten examples. Italy (Bonaparte, No. 253).

Also 3 dried skins without data.

The above generic name may be adopted for this genus, as Rafinesque includes but two species. They are *G. melastomus* and *Squalus uyato*, of which the first may be considered the type. If his intention was to have made *S. galeus* Linnæus his type he certainly has missed the opportunity, as that species is not even mentioned, and the inference may be only surmised by reference to his *Ind. It. Sicil.*, 1810. *Pristiurus* Bonaparte is thus superseded by *Galeus* Rafinesque.

#### HEMISCYLLIIDÆ.

*Chiloseyllium indicum* (Gmelin).

Three examples from Padang (C. H. Harrison, Jr., and H. M. Hiller), Sumatra. Color when fresh in arrack more or less uniform dull brown, lower surface of head, abdomen, and bases of pectorals and ventrals dirty cream-white. The largest 21 inches long. The youngest with very distinct markings. One specimen now in Stanford University.

*Orectolobus japonicus* (Regan).

One example without data. The Japanese material called *O. barbatus* by Jordan and Fowler<sup>2</sup> is this species.

#### GINGLYMOSTOMIDÆ.

*Ginglymostoma cirratum* (Gmelin).

One from St. Martin's (R. E. Van Rijgersma), W. I. Three other dried skins, and one alcoholic, may have the same data. They are all

<sup>1</sup> *Ann. Lyc. Nat. Hist. N. Y.*, 1861, p. 41.

<sup>2</sup> *Proc. U. S. Nat. Mus.*, XXVI, 1903, p. 606.

uniformly brown and without spots. The largest is but a little over 2 feet in length. The St. Martin's example shows: Head  $5\frac{1}{2}$ ; width of head about 1 in its length; snout  $1\frac{5}{8}$ ; eye 8; width of mouth about 3; interorbital space  $1\frac{2}{3}$ ; buccal cirrus 6; front margin of first dorsal about  $1\frac{1}{8}$ ; of second dorsal  $1\frac{2}{3}$ ; of anal  $1\frac{2}{3}$ ; pectoral  $1\frac{1}{6}$ ; ventral  $1\frac{2}{3}$ ; least depth of caudal peduncle  $4\frac{2}{3}$ ; length about 23 inches.

Two other examples, probably the *Squalus punctatus* Schneider, one evidently from St. Martin's (Rijgersma), W. I., and the other from Tortugas (James Roosevelt), Fla. Both are rather sparsely spotted with deep brown. Head  $5\frac{1}{8}$ ; depth  $7\frac{2}{3}$  to 8; snout  $1\frac{1}{8}$  to 2 in head; width of mouth  $2\frac{1}{2}$  to  $3\frac{1}{2}$ ; interorbital space  $1\frac{2}{3}$  to  $1\frac{5}{8}$ ; front margin of first dorsal  $1\frac{2}{3}$  to  $1\frac{3}{4}$ ; of second dorsal  $1\frac{3}{4}$  to  $1\frac{7}{8}$ ; of anal 2; least depth of caudal peduncle  $4\frac{1}{2}$  to 5; pectoral  $1\frac{1}{8}$  to  $1\frac{1}{5}$ ; ventral  $1\frac{5}{8}$  to 2; length  $12\frac{1}{2}$  to  $14\frac{3}{8}$  inches.

In the preliminary account of this genus by Müller and Henle<sup>3</sup> no species is mentioned, though Drs. Jordan and Gilbert have designated *Squalus cirratus* Gmelin<sup>4</sup> as its type. Müller and Henle's next account includes species.<sup>5</sup> Dr. Gill designates "*Type* *Ginglymostoma concolor*,"<sup>6</sup> which may be assumed to be congeneric with the species of the present group, though somewhat confusing as *Nebrius* Rüppell (its type *N. concolor* Rüppell) was admitted to *Ginglymostoma* by Dr. Gill himself.

#### CARCHARIIDÆ.

*Carcharias littoralis* (Mitchill).

Head 5; depth  $8\frac{3}{4}$ ; length of first dorsal 2 in head; of second dorsal  $2\frac{1}{4}$ ; of anal  $2\frac{2}{3}$ ; of lower caudal lobe  $2\frac{1}{3}$ ; pectoral  $1\frac{2}{3}$ ; tail  $12\frac{1}{2}$  in length of body; entire length  $44\frac{1}{2}$  inches. Nantucket (B. Sharp), Mass.

Head of a large example from Sea Isle City (W. J. Fox), and jaws from Townsend's Inlet (J. D. Casey), N. J., latter wrongly confused by me with *Lamna cornubica*.<sup>7</sup> Also 3 other pairs of jaws without data.

#### ALOPIIDÆ.

*Alopias vulpes* (Gmelin).

Head  $8\frac{2}{5}$ ; depth  $8\frac{2}{5}$ ; width of head  $1\frac{2}{3}$  in its length; depth of head  $1\frac{1}{4}$ ; snout about  $3\frac{1}{4}$ ; eye about 6; width of mouth 3; interorbital space  $2\frac{2}{3}$ ;

<sup>3</sup> Wieg. Arch., 1837, p. 396.

<sup>4</sup> Bull. U. S. Nat. Mus., No. 16, 1882, p. 18.

<sup>5</sup> Syst. Besch. Plag., 1838, p. 23.

<sup>6</sup> Ann. Lyc. Nat. Hist. N. Y., 1861, p. 40.

<sup>7</sup> Rep. N. J. State Mus., 1905, p. 56.

front margin of first dorsal  $1\frac{3}{7}$ ; least depth of caudal peduncle  $2\frac{3}{5}$ ; ventral  $1\frac{9}{10}$ ; about 38 series of teeth in upper jaw and 28 in lower; pectoral reaching  $\frac{4}{5}$  to ventral, and its greatest width 2 in its length. Color in alcohol dull gray-brown, more or less uniform, lower surface of trunk and head, also of pectoral and ventral, a little paler. Dorsals and caudal like back. Iris pale slaty-gray. Length 49 inches. Newport, R. I. J. C. Dunn.

Also a large dried skin (Bonaparte  $\frac{40}{T}$ ), probably from Italy?

#### LAMNIDÆ.

*Isurus oxyrinchus* Rafinesque.

Jaws of a large example, evidently this species, without data. Possibly from Italy?

*Lamna cornubica* (Gmelin).

Head about 5; depth about  $6\frac{1}{3}$ ; snout about  $2\frac{2}{5}$  in head; eye  $7\frac{3}{4}$ ; width of head about 3; gape of mouth  $2\frac{5}{7}$ ; interorbital space  $3\frac{3}{4}$ ; height of first dorsal  $2\frac{2}{5}$ ; length of second dorsal  $4\frac{3}{7}$ ; of anal  $4\frac{4}{5}$ ; least depth of caudal peduncle 9; greatest width of caudal peduncle  $4\frac{1}{4}$ ; front margin of lower caudal lobe  $1\frac{1}{2}$ ; pectoral  $1\frac{1}{4}$ ; ventral 3. Color in alcohol dull gray-brown on upper surface of body, and pale or whitish below, line of demarcation along side of caudal peduncle sharply defined. Dorsal and upper surface of caudal like back, lower pale like belly, though with more or less grayish. Upper surface of pectoral like back, lower paler like belly. Ventral and anal pale, slightly with grayish. Iris pale olive-gray, eyeball whitish. Teeth whitish. Length  $27\frac{1}{2}$  inches. Italy (Bonaparte).

#### CETORHINIDÆ.

*Cetorhinus maximus* (Gunner).

Although there is no example in the collection, a large dried mounted skin, said to have been taken in Monterey Bay, Cal., was exhibited in Philadelphia several years ago, and was examined by Mr. Witmer Stone and myself.

#### GALEORHINIDÆ.

*Cynais canis* (Mitchill).

Nantucket (Sharp), Mass.; Newport (J. Leidy and S. Powel), R. I.; Sea Isle City (Fox), Atlantic City (C. W. Buvinger, G. W. Tryon, Jr.), and Great Egg Harbor Bay (Leidy), N. J.; E. Coast U. S. (Smiths. Inst.); Italy (Bonaparte).

**Mustelus mustelus** (Linnæus).

(*M. equestris* Bonaparte, Icon. Faun. Ital., Pesc. III, pt. 2, vii, 1834, descr., Pl., fig. 2, mari d'Italia.)

Head  $6\frac{1}{2}$ ; depth about 9; width of head  $1\frac{4}{7}$  in its length; depth of head at posterior margin of eye  $2\frac{1}{2}$ ; snout measured to eye  $2\frac{2}{5}$ ; eye  $5\frac{2}{5}$ ; width of mouth  $2\frac{3}{4}$ ; interorbital space  $2\frac{3}{4}$ ; width of internasal space  $6\frac{1}{2}$ ; front margin of first dorsal  $1\frac{1}{8}$ ; of second dorsal  $1\frac{1}{5}$ ; of anal  $2\frac{2}{7}$ ; least depth of caudal peduncle  $6\frac{2}{5}$ ; front margin of lower caudal lobe  $2\frac{1}{10}$ ; upper margin of pectoral  $1\frac{1}{10}$ ; front margin of ventral 2.

Body very elongate, depressed in front, sides well compressed, and tapering posteriorly into a long slender caudal, greatest depth about origin of first dorsal. Edges of body rather slightly convex or depressed, a very obsolete or slight median ridge down back most pronounced on upper surface of caudal peduncle, and down postventral and postanal regions a well-developed deep median groove. Caudal peduncle slender, compressed, and its least depth about  $1\frac{2}{3}$  in its length.

Head well depressed, profiles tapering similarly, and as viewed above rather elongate with somewhat attenuately convergent margins though tip rounded. Snout broadly depressed, edge rather trenchant, and its length but a trifle less than its width. Eye elongate, large, laterally superior, and placed about midway in length of head. Mouth rather broad, symphysis of mandible slightly in front of anterior margin of eye, and rami would nearly form a right angle. Lips thin and hardly developed. At angle of mouth externally a rather long fleshy fold forming a well-developed flap projecting posteriorly, and though groove distinct posteriorly around it, it extends but very little along outer margin anteriorly. About 55 series of blunt tubercles or pavement-like teeth in each jaw. Buccal folds rather narrow. Tongue large, broad, its surface minutely asperous, and edges all free and sharp. Nostrils large, well separated on each side of snout below, near last third in length of latter measured to eye, and each with a well-developed flap. Interorbital space broad, well depressed, and but very slightly convex.

Gill-openings 5, last 2 over base of pectoral, and third deepest or about 2 in interorbital space. Spiracle small, distinct, and placed behind eye a space equal to about  $\frac{1}{3}$  its horizontal diameter.

Body covered everywhere with minute shagreen denticles of uniform size.

Origin of first dorsal much closer to origin of pectoral than that of ventral or a little nearer tip of snout than origin of second dorsal, its

apex forming nearly over its posterior basal margin, and a long slender point projecting behind equal in length to width of mouth. Origin of second dorsal a little nearer posterior basal margin of first dorsal than origin of upper lobe of caudal, base of fin like that of first dorsal well elevated and fleshy, and fin otherwise similar with posterior point about equal to eye horizontally. Caudal long and slender, origin of upper lobe begins a little behind that of lower, and its distal expansion about  $3\frac{1}{2}$  in its own length. Lower caudal lobe a little elevated below, and length of its base about  $1\frac{1}{2}$  in entire length of upper. Anal inserted a little behind middle of base of second dorsal, or a little nearer origin of lower caudal lobe than tip of depressed ventral, and similar to second dorsal, only smaller, posterior point equal to horizontal eye-diameter. Pectoral large, upper margin rather evenly convex, reaching  $\frac{2}{3}$  to origin of ventral, and its posterior margin slightly concave. Ventral inserted about midway between origin of ventral and that of anal, rather broad, and its lower margin a little concave. Clasper small, about half length of posterior point.

Color in alcohol dull uniform gray-brown above, merging into grayish-white tint uniformly over lower surface of body. Upper fins like back or with grayish, both pectoral and ventral paler below. Iris pale brassy and pupil slaty.

Length about 26 inches.

No. 617, A. N. S. P., cotype of *M. equestris* Bonaparte. Italy (Bonaparte, No. 248). From Dr. T. B. Wilson.

Also Nos. 618 to 620, with same data. They show: Head  $5\frac{3}{4}$  to  $6\frac{1}{2}$ ; depth  $8\frac{1}{2}$  to  $10\frac{1}{5}$ ; width of head  $1\frac{4}{7}$  to  $1\frac{3}{4}$  in its length; snout 2 to  $2\frac{1}{8}$ ; eye  $4\frac{1}{3}$  to  $6\frac{1}{5}$ ; width of mouth  $3\frac{2}{7}$  to  $3\frac{1}{2}$ ; interorbital space  $2\frac{1}{2}$  to  $2\frac{3}{8}$ ; front edge of first dorsal  $1\frac{4}{7}$  to  $1\frac{3}{4}$ ; front edge of anal  $1\frac{2}{7}$  to  $2\frac{3}{8}$ ; pectoral 1 to  $1\frac{3}{8}$ ; length  $10\frac{1}{2}$  to  $21\frac{3}{4}$  inches. The smallest example is uniform on the back, like the larger ones, and is without any spots or markings. My confusion of these examples with *Galeorhinus galeus*<sup>8</sup> was due to the original labels being evidently wrongly placed. I have verified this by an examination of Bonaparte's original catalogue, where they are also wrongly entered in the latter's own handwriting.

**Mustelus mento** Cope. Fig. 1.

(Proc. Am. Philos. Soc. Phila., XVII, 1877, p. 47, Pacific Ocean at Pecosmayo, Peru.)

Head about 5; depth  $7\frac{3}{8}$ ; width of head  $1\frac{3}{8}$  in its length; snout  $2\frac{1}{8}$ ; eye  $5\frac{1}{2}$ ; width of mouth  $3\frac{3}{8}$ ; interorbital space  $2\frac{3}{8}$ ; front margin of

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<sup>8</sup> *Proc. Acad. Nat. Sci. Phila.*, 1901, p. 332, Pl. 13, fig. 4 (anatomy).

first dorsal  $1\frac{9}{10}$ ; front margin of second dorsal  $2\frac{2}{7}$ ; front margin of anal about 3; front margin of lower caudal lobe  $2\frac{1}{2}$ ; least depth of caudal peduncle  $6\frac{1}{4}$ ; pectoral  $1\frac{3}{4}$ ; ventral  $2\frac{9}{10}$ . Body rather well compressed, back elevated, edges rather rounded or convex, a very slight median keel down back and a slight median depression down post-ventral and postanal regions. Caudal peduncle slender, well compressed, and its least depth about  $\frac{3}{7}$  its length. Head broad, depressed, profiles similar, and when viewed above rather narrowly convergent

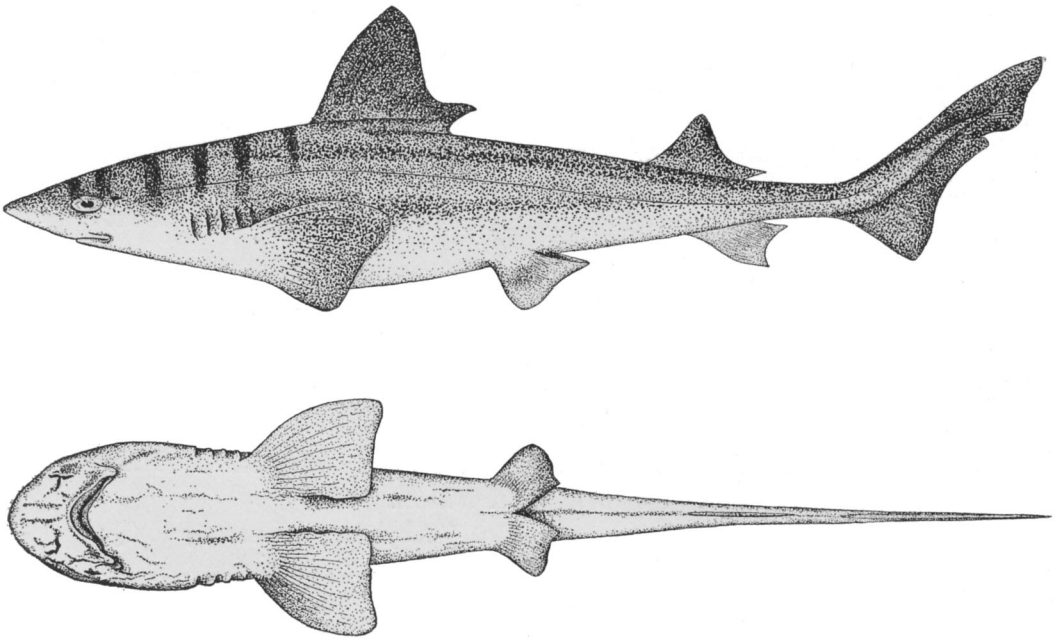


Fig. 1.—*Mustelus mento* Cope. (Type.)

with rounded tip. Edges of snout rather trenchant, and its length equal to its greatest width. Eye elongate, and its center a trifle posterior in length of head. Mouth moderately broad, symphysis falling but a trifle before front of eye, and rami would form a right angle. Lips thin and little free. At each corner of mouth a pointed flap, free behind and with a rather long outer fold. Teeth pavement-like, in about 50 series. Upper buccal fold papillose, with a slightly ragged margin, not entire as stated previously, and narrow. Lower buccal fold entire. Tongue rather pointed, its upper surface very finely asperous, and margins free. Nostrils large, inferior, well separated, about last third in snout measured to eye, and each with a well-developed flap. Interorbital space convex. Body

everywhere minutely roughened. Origin of first dorsal nearly midway between tip of snout and origin of second dorsal, apex of fin falling about midway in its length, and posterior pointed flap equals eye horizontally. Origin of second dorsal a little nearer that of first dorsal than last caudal vertebra. Anal with its apex about opposite its posterior basal margin. Upper lobe of caudal begins a little after that of lower, and its distal expansion about  $2\frac{1}{4}$  in its length. Lower caudal lobe a little elevated in front, and its height about  $3\frac{1}{2}$  in its length. Pectoral reaches  $\frac{2}{3}$  to ventral. Ventral inserted a trifle nearer origin of pectoral than posterior basal margin of anal, and reaching a trifle more than half-way to anal. Color in alcohol with under surfaces of pectorals and ventrals grayish, otherwise fins of more or less uniform tint of back. Iris pale yellowish-brown, pupil dusky. Length  $12\frac{1}{4}$  inches. No. 21,104, A. N. S. P., type of *M. mento* Cope. Pacific Ocean at Pecosmayo, Peru (J. Orton). Coll. of 1876-77. From Cope.

*Triakis felis* (Ayres).

Santa Barbara (U. S. F. C.), Cal.

I adopt *Mustelus felis* Ayres for this species, as his name has evident priority. His paper<sup>9</sup> was read December 4, 1854, which is in the signature dated December 25. This was received by the Academy of Natural Sciences of Philadelphia on February 6, 1855.<sup>10</sup> *T. semifasciatus* Girard occurs in No. 6 of the same volume,<sup>10</sup> which was elsewhere<sup>11</sup> not acknowledged as having been received until February 20, 1855, and therefore this date may be accepted for its publication.

*Galeorhinus galeus* (Linnæus).

Head  $5\frac{1}{4}$ ; depth about  $8\frac{1}{5}$ ; snout about  $2\frac{1}{8}$  in head; eye 5; length of mandible 3; width of mouth  $2\frac{1}{5}$ ; tip of snout to mandible  $2\frac{2}{7}$ ; inter-orbital space  $2\frac{2}{7}$ ; front margin of first dorsal  $1\frac{9}{10}$ ; of second dorsal  $3\frac{2}{7}$ ; of anal  $4\frac{2}{3}$ ; least depth of caudal peduncle about 5; pectoral  $1\frac{2}{5}$ ; ventral  $3\frac{2}{3}$ ; length  $17\frac{3}{4}$  inches. Italy (Bonaparte, No. 254). The other three examples are all smaller, the smallest 9 inches long and showing the attachment of the placenta still in good preservation. These were confused as *Galeus mustelus* by me, as already explained.

Also a dried skin, without data, 44 inches long.

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<sup>9</sup> In *Proc. Cal. Acad. Sci.*, I.

<sup>10</sup> See *Proc. Acad. Nat. Sci. Phila.*, VII, p. xxii, in donations to the library.

<sup>11</sup> *New York Lyc. Nat. Hist.*

**Galeorhinus zyopterus** Jordan and Gilbert.

(Bull. U. S. Nat. Mus., XVI, 1883, p. 871, evidently based on *G. galeus* Jordan and Gilbert, Proc. U. S. Nat. Mus., III, 1880, p. 42, San Pedro, California; Jordan and Gilbert, *l.c.*, p. 458, San Francisco, Cal.)

Head  $5\frac{2}{7}$ ; depth 11?; width of head  $1\frac{3}{5}$  in its length; depth of head at posterior margin of eye about  $2\frac{3}{4}$ ; snout  $2\frac{1}{5}$ ; eye  $4\frac{1}{2}$ ; width of mouth at corners  $2\frac{1}{3}$ ; interorbital space  $2\frac{1}{5}$ ; front margin of first dorsal 2; of second dorsal about 2; of lower caudal lobe  $1\frac{3}{5}$ ; least depth of caudal peduncle 5; upper margin of pectoral  $1\frac{1}{3}$ ; front margin of ventral about 5.

Body elongate, slender, depressed anteriorly and tapering back from head. Down middle of back, also middle of postventral and postanal regions, a longitudinal groove. Caudal peduncle slender, its least depth about  $2\frac{1}{2}$  in its length.

Head broadly depressed, about equally so above and below, and as viewed from above profile rather elongately convergent with rounded tip. Snout well depressed, its edge but slightly trenchant, and space between its own tip and front of mouth equal to width of latter. Eye large, elongate, lateral and its center falling a trifle posterior in length of head. Nictitating membrane large, well developed, and with a deep pocket between itself and eye. Rami of mandible would nearly form a right angle, though symphysis not quite extended forward till opposite front rim of eye. Teeth pointed, mostly tricuspid, and directed towards side of mouth, with outer cusp of each of lateral teeth best developed. About 44? series of teeth in upper jaw. Buccal folds rather well developed and papillose. Tongue large, broad, flattened, rounded in front, and its edge free. Nostrils rather large, well separated or internasal space about half width of mouth, each with a small fleshy point, and placed about last  $\frac{2}{7}$  in snout measured to front of eye. Interorbital space broad, a little convex, and depressed medianly.

Gill-openings 5, last 2 over base of pectoral, and third and fourth largest or about  $1\frac{3}{5}$  in eye horizontally.

Body covered everywhere with simple shagreen points of moderately small and uniform size.

Origin of first dorsal a little nearer that of second than tip of snout, forming a rather rounded lobe with its apex just before posterior basal margin of fin, and point of latter equals eye horizontally. Origin of second dorsal nearer that of first than end of last caudal vertebra by a space equal to width between outer edges of nostrils, apex of fin forming about over middle of its length, and its posterior point about  $1\frac{1}{3}$  in eye horizontally. Origin of anal a trifle after that of second dorsal, its apex forming about first third in its length and its posterior point  $1\frac{2}{7}$  in eye horizontally. Origin of lower caudal lobe a little in advance

of that of upper, and height of fin at this point about  $2\frac{2}{5}$  in length of its base. Upper caudal lobe broad, its expansion at end nearly equal to width of mouth or about  $3\frac{2}{3}$  in its length. Pectoral broad, larger than first dorsal, and reaching  $\frac{4}{7}$  to ventral, with posterior margin a little incised. Ventral inserted a little nearer origin of first dorsal than that of anal, and reaching  $\frac{3}{7}$  to origin of latter. Clasper equals posterior anal point.

Color in alcohol deep gray-brown on back, becoming paler gray on sides, and lower surface whitish. Upper surface of snout pale brownish. Teeth all whitish. Iris livid grayish and pupil slaty. Nictitating membrane pale like side of head. Dorsals pale brownish, upper or outer portion of lobe dusky to blackish and posterior point becoming very pale to whitish. Caudal pale brownish, end of upper lobe and notch behind lower dusky to blackish, fin otherwise more or less pale. Pectoral dusky or blackish above, pale to grayish below. Ventral and anal whitish like lower surface of body.

Length  $12\frac{3}{4}$  inches.

No. 582, A. N. S. P., cotype of *G. zyopterus* Jordan and Gilbert. San Francisco, California (U. S. F. C. No. 27,190).

*Galeocerdo tigrinus* Müller and Henle.

Head  $6\frac{1}{8}$ ; depth  $11\frac{5}{8}$ ; width of head  $1\frac{3}{8}$  in its length; snout 3; width of mouth  $2\frac{1}{10}$ ; space between tip of snout and front of mouth 4; inter-orbital space  $1\frac{2}{3}$ ; pectoral  $1\frac{1}{4}$ ; base of ventral  $4\frac{1}{3}$ ; caudal nearly 2 in rest of body. Body broad, depressed, and trunk rather slender posteriorly. Caudal peduncle broad, and side from below second dorsal bluntly keeled till opposite middle of lower elongate caudal lobe. Head large, very broad, depressed. Snout broad, rounded. Length of pre-or al region about  $\frac{2}{3}$  width of mouth. Eye anteriorly lateral, with nictitating membrane. Mouth large, beginning well before eye, and gape extends one diameter behind latter. Corner of mouth with long outer fold. Teeth about  $\frac{1}{8}$ , broad, compressed, directed laterally, finely serrated along margins, and with five small cusps externally. Tongue broad, not free. Lips rather thin. Nostrils lateral, with small flaps, and nearer front edge of snout than front of mouth. Inter-orbital space convex. Anterior gill-openings large, third largest, and last two over base of pectoral. Peritoneum silvery. Shagreen very fine. First dorsal inserted opposite posterior basal edge of pectoral, with sharp point behind, and height of fin a little less than base. Second dorsal inserted about midway between caudal pits and origin of ventral. A narrow median low keel along back between dorsals. Anal small, inserted below first third of base of second dorsal, its margin deeply

concave, and with a sharp point posteriorly. Lower caudal lobe about  $2\frac{4}{5}$  in upper. Caudal notch near tip. Pectoral falcate, margin concave and reaching posteriorly below posterior base of dorsal. Ventral small, broad, obtuse, and inserted nearly midway between posterior basal edge of first dorsal and origin of second dorsal. Color when fresh in arrack slaty-gray, paler below. Upper surface of body and pectoral, also dorsal and caudal, variegated with deep leaden-gray blotches, and many of those on side of trunk more or less elongate and vertical. Length  $39\frac{1}{4}$  inches. Padang, Sumatra (Harrison and Hiller).

Very large jaws from Guaymas, Mexico; also a pair from Beesley's Point, N. J. (S. Ashmead); a pair from between Turk's Island and Barbadoes (Dr. W. H. Freeman).

**Prionace glauca** (Linnaeus).

Head 5; depth about  $10\frac{1}{2}$ ; width of head about 2 in its length; snout  $2\frac{2}{5}$ ; eye about  $7\frac{1}{2}$ ; width of mouth about  $3\frac{1}{3}$ ; interorbital space  $2\frac{3}{5}$ ; front margin of first dorsal  $2\frac{1}{5}$ ; front margin of second dorsal  $4\frac{2}{5}$ ; front margin of anal about 4; least depth of caudal peduncle about  $7\frac{1}{5}$ ; pectoral  $1\frac{2}{7}$ ; ventral  $3\frac{1}{4}$ . Teeth with entire edges, and each lateral tooth of upper jaw followed by about four cusps and in lower by one or two. Median teeth in each jaw erect, smaller and with a single slender point. Color in alcohol deep chocolate-brown on back and upper surface, and lower surface pale creamy-white. Dorsals and caudal, except basally at lower lobe, which is whitish, dark like back. Upper surface of pectoral and ventral dark like back, though latter paler, and lower surfaces grayish to whitish like belly. Entire lower surface of head whitish like belly. Iris grayish-slaty, pupil pale. Length 23 inches. Italy (Bonaparte, No. 250).

Another dried skin, without data, is 48 inches long.

**Eulamia milberti** (Müller and Henle).

One from Great Egg Harbor Bay (Dr. J. Leidy).

The name *Carcharias* Rafinesque cannot be applied to this genus, as the only species mentioned for it, and therefore its type, is *taurus*, a sand shark identical with Agassiz's genus *Odontaspis*. *Carcharhinus* Blainville<sup>12</sup> is next in order. It is based on *commersonii*, *lamia*, *lividus*, *ustus*, *heterodon*, *verus*, *broussonetii*, *glaucus*, *cæruleus*, *megalops*, *heterobranchialis*, *cornubicus*, *monensis*?, *vulpes*. Drs. Jordan and Gilbert restrict the first species (*commersonii*) as its type, but all the evidence shows it to be a nomen nudum, and their suggestion that it is based on Lacépède's figure of *Le Squale Requin*<sup>13</sup> seems only assumption when

<sup>12</sup> *Bull. Soc. Philomath.*, Paris, 1816, p. 121.

<sup>13</sup> *Hist. Nat. Poiss.*, I, 1799, pp. 165, 169, Pl. 8, fig. 1.

judged from Blainville's work alone. If the next of Blainville's specific names are considered, *lamia* is found first proposed as *Carcharias lamia* by Rafinesque,<sup>14</sup> without description or diagnosis, and simply as "(Squalus carcharias Linnæus). Carcaria lamia. Pesce Caine, Imbestinu, ò Lamia." Thus it would be typified by *S. carcharias* Linnæus, which would upset *Carcharodon* of Smith, in which case I shall consider the *Squalus vulpes* Gmelin the type of *Carcharhinus* Blainville. The next generic name available is *Eulamia* Gill, which had best be adopted.

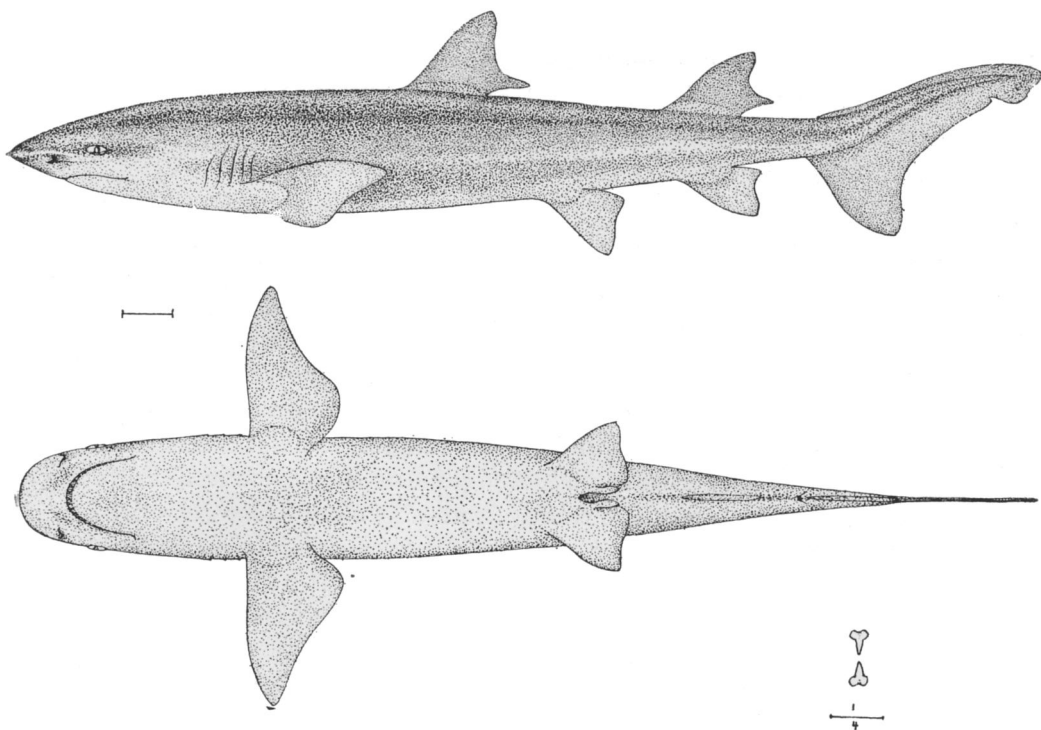


Fig. 2.—*Eulamia odontaspis* Fowler. (Type.)

***Eulamia odontaspis*** sp. nov. Fig. 2.

Head  $5\frac{1}{4}$ ; depth  $8\frac{2}{3}$ ; width of head about  $1\frac{2}{3}$  in its length; depth of head at first gill-opening  $1\frac{3}{4}$ ; snout  $2\frac{2}{5}$ ; width of mouth  $2\frac{4}{7}$ ; interorbital space 2; front edge of first dorsal  $1\frac{2}{3}$ ; of second dorsal 2; of anal  $2\frac{1}{8}$ ; of lower caudal lobe  $1\frac{2}{3}$ ; least depth of caudal peduncle about 5; pectoral  $1\frac{1}{3}$ ; ventral  $2\frac{3}{7}$ .

Body depressed anteriorly, apparently rather robust, a slight median

<sup>14</sup> *Ind. It. Sicil.*, 1810, p. 44.

depression down back and another down postventral and postanal regions, greatest depth about origin of dorsal. Caudal peduncle compressed, and its least depth about  $1\frac{1}{8}$  in its length.

Head rather well depressed, profiles similar apparently. Snout well depressed, rather short, when viewed above broadly convex, and its length to front of mouth about  $\frac{3}{5}$  its width at that point. Eye small, elongately ellipsoid, and its center about first  $\frac{2}{5}$  in head. Nictitating membrane rather broad. In profile end of mandible a little before front rim of eye, as seen from below profile of symphysis rather broadly convex in front, and its length  $\frac{4}{5}$  its width. No grooves at corners of mouth. Teeth about  $\frac{2.5}{2}$ , similar in both jaws, without basal cusps, edges entire, slender, compressed, of rather uniform size and sharply pointed. Nostrils large, lateral, below on snout near last third of its length. Interorbital space broadly convex.

Gill-openings 5, second and third deepest or about 5 in head, and last two over base of pectoral. No spiracle.

Body covered with very fine shagreen, scarcely rough to touch.

Origin of first dorsal about midway between tip of snout and tip of posterior depressed point of second dorsal, and posterior point  $2\frac{1}{4}$  in length of fin. Origin of second dorsal about an eye-diameter nearer that of upper caudal lobe than posterior basal margin of first dorsal, and posterior point of fin  $2\frac{3}{4}$  in its front margin. Caudal rather small, upper lobe begins a trifle behind lower, and its length about  $3\frac{3}{8}$  in rest of body. A pit on caudal peduncle, both above and below, at origins of caudal lobes. Anal begins very slightly behind origin of second dorsal, and fin reaching  $1\frac{1}{2}$  to origin of lower caudal lobe, tip of posterior process not extending back beyond that of end of fin in front. Pectoral broad, inserted rather low, and when depressed reaching about opposite origin of first dorsal, its greatest width  $1\frac{1}{3}$  in its length. Ventral broad, its origin slightly behind tip of depressed dorsal, and depressed fin reaching  $1\frac{3}{4}$  to anal. Claspers small.

Color of dried skin dull brown generally, lower surface scarcely paler. Fins all unicolor.

Length about  $20\frac{1}{4}$  inches.

Type No. 34,634, A. N. S. P. No data, but probably from the Indian Ocean?

This interesting specimen is probably identical with Day's figure of *Carcharias ellioti*.<sup>15</sup> His description, however, differs in the outer labial groove, serrated teeth with basal cusps, first dorsal beginning

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<sup>15</sup> *Fishes of India*, IV, 1880, p. 716, Pl. 189, fig. 2.

behind base of pectoral with its base being nearer latter than ventral, inner margin of pectoral  $\frac{1}{3}$  of its outer and fin reaching below end of base of dorsal, anal below last  $\frac{2}{3}$  of second dorsal, and caudal  $3\frac{1}{4}$  in total. His figure of a skin, 6 feet long, differs in some minor details from my example, which however may be due to age.

(Ὀδῶς, tooth, ἄσπις, scale; hence *Odontaspis*, an old generic name applied to the sand sharks, and here used with reference to the superficial resemblance of this species.)

***Eulamia longimanus* (Poey).**

Head about  $6\frac{2}{7}$ ; depth  $8\frac{1}{5}$ ; width of head  $1\frac{3}{5}$ ; snout  $2\frac{3}{4}$  in head; width of mouth  $2\frac{3}{8}$ ; interorbital space  $1\frac{9}{10}$ ; height of first dorsal  $2\frac{4}{5}$ ; of second dorsal  $7\frac{3}{4}$ ; least depth of caudal peduncle 4; lower caudal lobe  $2\frac{1}{8}$ ; pectoral  $1\frac{1}{8}$ ; ventral  $2\frac{3}{4}$ ; upper caudal lobe  $3\frac{3}{8}$ . Teeth all finely serrated and upper but little notched on outer margins. Dorsal inserted just after base of pectoral. Width of pectoral 2 in its length. Length 39 inches. Dried skin without data.

Jaws of large example from West Palm Beach (G. B. Wood), Fla., in 1907. Another pair of jaws from the Gulf of Florida (Dr. G. Watson) is probably this species.

***Eulamia menisorrhah* (Müller and Henle).**

Head  $6\frac{1}{8}$ ; depth  $8\frac{3}{5}$ ; width of head  $1\frac{2}{5}$  in its length; snout  $2\frac{1}{4}$ ; width of mouth  $2\frac{3}{8}$ ; tip of snout to mandible 3; interorbital space 2; height of first dorsal  $1\frac{1}{8}$ ; pectoral 1; length of ventral to posterior tip  $1\frac{1}{2}$ ; least depth of caudal peduncle  $4\frac{3}{8}$ ; caudal 3 in rest of body. Teeth without serrations, each with several small cusps. Length  $25\frac{1}{8}$  inches. Padang (Harrison and Hiller), Sumatra.

Also a very young example with same data. Edge of first dorsal very narrowly margined with black, also ends of second dorsal and caudal.

***Eulamia oxyrhynchus* (Müller and Henle).**

Head about  $4\frac{3}{8}$ ; depth  $11\frac{1}{4}$ ; width of its head  $2\frac{2}{5}$  in its length; snout about  $2\frac{1}{10}$ ; width of mouth  $2\frac{3}{4}$ ; interorbital space  $3\frac{2}{5}$ ; front margin of first dorsal  $2\frac{3}{8}$ ; of second dorsal 4; of anal about 4; of lower caudal lobe  $2\frac{9}{10}$ ; pectoral  $1\frac{3}{8}$ ; length of ventral  $3\frac{2}{3}$ ; least depth of caudal peduncle  $3\frac{1}{2}$  in snout; eye 8; upper caudal lobe equals head; length  $17\frac{1}{2}$  inches. Dried skin without data, though probably from Surinam? (Hering?).

It differs a little from Müller and Henle's figure, most likely in respect to age, in having insertion of first dorsal a little more posterior or opposite posterior basal edge of pectoral, depressed pectoral not reaching beyond posterior basal margin of first dorsal, depressed first

dorsal reaching  $1\frac{1}{2}$  to ventral, origin of anal slightly before that of second dorsal, and origin of ventral nearly midway between posterior basal margin of first dorsal and origin of anal.

*Scoliodon laticaudus* (Müller and Henle).

A small example,  $7\frac{1}{2}$  inches long. Straits of Malacca. It agrees largely with Müller and Henle's figure.

*Scoliodon terræ-novæ* (Richardson).

Bayport (Cope), Fla.

Two dried skins, larger 38 inches long, are evidently this species; no data.

#### SPHYRNIDÆ.

*Sphyrna tiburo* (Linnaeus).

Newport (Powell) R. I.; St. Augustine (W. Blanding), Fla., in May, 1832.

*Sphyrna tudes* (Valenciennes).

Head  $4\frac{1}{2}$ ; depth 7; length of disk, along its posterior margin,  $\frac{3}{4}$  its width transversely at second undulation; width of head just after hammer  $2\frac{1}{6}$  in head; width of mouth about  $3\frac{1}{2}$ ; third gill-opening  $5\frac{1}{2}$ ; front margin of first dorsal  $1\frac{1}{2}$ ; length of second dorsal  $2\frac{2}{3}$ ; of anal 2; least depth of caudal peduncle 4; pectoral  $1\frac{1}{2}$ ; ventral  $2\frac{2}{7}$ . Teeth in about 26 series in mandible. Color in alcohol plain pale brown, a little darker on upper surface of body and paler or whitish on lower. Fins all grayish-brown. Iris slaty. Length 8 inches. Surinam (Hering).

*Sphyrna zygaena* (Linnaeus).

Nantucket (Sharp), Mass.; Sea Isle City (W. J. Fox), Holly Beach (Miss Edith Ives) and Grassy Sound (Fowler), N. J.; Surinam (Hering); Panama (W. S. W. Ruschenberger); Italy (Bonaparte, 251); Padang (Harrison and Hiller), Sumatra. Also 4 dried skins without data.

*Sphyrna blochii* (Cuvier).

Head  $6\frac{1}{2}$ ; depth about  $9\frac{1}{4}$ ?; least width of head behind hammer  $1\frac{1}{2}$  in its length; greatest width of hammer  $2\frac{1}{2}$  in its length, measured along its inner margin; least width of hammer 4; space between tip of snout medianly and margin of upper jaw about 3 in head; width of mouth 2; length of third gill-opening about 4; base of first dorsal  $1\frac{1}{2}$ ; entire length of second dorsal about  $1\frac{1}{2}$ ; base of anal about  $2\frac{1}{2}$ ; least depth of caudal peduncle  $3\frac{1}{2}$ ; front margin of lower caudal lobe  $1\frac{1}{2}$ ; length of pectoral 1; base of ventral  $2\frac{2}{7}$ ; clasper  $1\frac{1}{2}$ .

Body long, slender, apparently little compressed, but rather rounded

or robust, greatest depth about origin of dorsal, and edges of body depressed or flattened. No very evident pits at origins of caudal lobes. Caudal peduncle rather robust, scarcely compressed, and its least depth  $1\frac{2}{7}$  in its length.

Head moderately large, well depressed both above and below and with evenly convex surfaces. Snout rather broadly depressed and moderately short, as viewed from above front margin undulate with a median emargination where tip would form. Each side of head produced laterally into a very narrow long depressed hammer-like process with its front margin much thicker than posterior, also former as viewed above a little undulate in profile while posterior is nearly straight. Along anterior margin of each hammer a rather deep groove, extending from nostril half-way to median point of snout and distally to end of hammer. Eye at anterior external lateral extremity of hammer, elongate, rather small, and its horizontal diameter about  $4\frac{1}{5}$  in distal expansion of hammer. Nictitating membrane broad, conspicuous, and evidently leaving a deep pocket on each side. Mouth broad, margin of upper jaw rather evenly lunate or convex, and ramus of mandible would form a very obtuse angle. Gape of mouth about  $\frac{2}{3}$  its width. No groove at each corner of mouth. Teeth all moderately large, directed laterally, entire, rather broadly triangular, and each with an external notch, no basal cusps. About 28 series of teeth in upper jaw and about 24 series in lower. Nostril inferior on hammer along its anterior margin near basal fifth of latter, as measured along its posterior margin, or about inner  $\frac{2}{5}$  of space between tip of snout and end of hammer. Nostril furnished with but a slight flap. Top of head rather broadly convex.

Gill-openings, first a little nearer posterior margin of hammer basally than origin of dorsal, last two over base of pectoral, and second and third largest. No spiracle.

Body covered entirely with very minute shagreen denticles of apparently uniform size. On lower surface of hammer anteriorly a number of more or less conspicuous small pores.

Origin of first dorsal nearer tip of snout than that of second or about opposite first fifth in space between origin of pectoral and that of ventral, fin high, falcate, apex forming above just behind its base which is  $1\frac{3}{4}$  in its height, and its posterior point about  $3\frac{1}{5}$  in head. Origin of second dorsal a little nearer that of first dorsal than end of last caudal vertebra or about over middle of base of anal, base of fin about  $\frac{3}{7}$  of its total length and long posterior point  $3\frac{3}{5}$  in head. Origin of anal a little nearer posterior basal margin of ventral than origin of

lower caudal lobe, larger and also inserted well before second dorsal. posterior point about  $1\frac{3}{4}$  in its length and anterior lobe about equal to length of base. Origins of caudal lobes nearly opposite(?), and distal expansion of upper  $7\frac{2}{3}$  in its length. Anterior lobe of lower caudal lobe  $2\frac{1}{10}$  in length of latter. Upper caudal lobe  $2\frac{1}{3}$  in rest of body. Pectoral much smaller than first dorsal, interventral space about  $\frac{1}{3}$  in length of fin, and greatest width about 2 in latter. In form pectoral rather falcate and pointed and would reach about  $\frac{2}{3}$  of space to ventral. Ventral inserted a little nearer origin of pectoral than that of lower caudal lobe, fin low, its greatest height about last fourth of its length, and clasper well developed.

Color of dried skin deep dusky-brown over entire upper surface of body, including dorsals and upper lobe of caudal. Upper surfaces of pectoral and ventral of same tint. Entire lower surface of body pale gray-brown, this also largely over remaining portions of fins, anal and claspers. Teeth whitish.

Length  $50\frac{1}{2}$  inches.

Pondichery, India. June 9, 1840. Thomas Ryan.

It differs from Cantor's figure<sup>16</sup> in the narrower and longer hammer.

#### SQUALIDÆ.

*Oxynotus centrina* (Linnæus).

Head  $5\frac{3}{8}$  to  $5\frac{1}{4}$ ; depth  $5\frac{1}{4}$  to  $7\frac{1}{8}$ ; width of head  $1\frac{4}{8}$  to 2 in its length; depth of head  $1\frac{1}{2}$  to  $1\frac{5}{8}$ ; snout  $2\frac{5}{8}$  to 3; eye  $3\frac{2}{8}$  to 4; width of mouth  $3\frac{3}{8}$  to  $4\frac{1}{8}$ ; interorbital space  $2\frac{1}{10}$  to 3; first dorsal spine  $1\frac{1}{8}$  to  $1\frac{3}{8}$ ; second dorsal spine  $1\frac{3}{8}$  to  $1\frac{9}{10}$ ; least depth of caudal peduncle 4; height of lower caudal lobe 2 to  $2\frac{7}{8}$ ; pectoral 1; ventral  $1\frac{4}{8}$  to  $1\frac{3}{8}$ ; length  $9\frac{1}{4}$  to 12 inches Italy (Bonaparte, No. 242). From Wilson.

Also another, dried skin, with same data, No.  $\frac{41}{1}$ .

*Squalus acanthias* Linnæus.

Castine (G. B. Wood) and Mt. Desert (Dr. H. C. Chapman), Maine; Gloucester (U. S. N. M.), Mass.; Cape May (H. W. Hand), N. J.; Italy (Bonaparte, No. 246).

*Squalus blainville* (Risso).

Head  $5\frac{1}{2}$ ; depth 8 to  $9\frac{2}{5}$ ; width of head  $1\frac{2}{8}$  to  $1\frac{1}{2}$  in its length; depth of head at first gill-opening  $1\frac{1}{8}$  to  $2\frac{1}{8}$ ; snout  $2\frac{1}{2}$  to  $2\frac{3}{8}$ , measured from front of mouth; eye  $3\frac{3}{8}$  to  $4\frac{1}{8}$ ; width of mouth  $2\frac{4}{8}$  to  $2\frac{9}{10}$ ; interorbital space  $2\frac{1}{8}$  to  $2\frac{3}{8}$ ; first dorsal spine  $2\frac{2}{8}$  to  $2\frac{4}{8}$ ?; second dorsal spine  $2\frac{2}{8}$  to

<sup>16</sup> *Quart. Journ. Calcutta Med. Phys. Soc.*, No. V, January 1, 1838, Pl. 1.

$2\frac{3}{8}$ ; least depth of caudal peduncle 7 to  $8\frac{1}{8}$ ; pectoral  $1\frac{1}{2}$  to  $1\frac{5}{7}$ ; ventral  $1\frac{1}{8}$  to  $1\frac{7}{8}$ ; teeth in 26 series in jaw; length  $18\frac{5}{8}$  to 26 inches. Italy (Bonaparte, No. 249). Three examples.

*Entoxychirus uyato* (Rafinesque).

Head  $4\frac{1}{2}$ ; depth 8; width of head  $1\frac{3}{8}$  in its length; snout  $2\frac{3}{4}$ ; eye  $3\frac{2}{5}$ ; width of mouth  $2\frac{7}{8}$ ; interorbital space  $2\frac{2}{5}$ ; first dorsal spine  $2\frac{7}{8}$ ; second dorsal spine  $3\frac{2}{5}$ ; least depth of caudal peduncle  $5\frac{1}{8}$ ; pectoral  $1\frac{3}{8}$ ; ventral 2; teeth about  $\frac{4}{3}\frac{4}{0}$ ; length  $20\frac{1}{8}$  inches. Italy (Bonaparte, No. 241).

*Centrophorus granulosus* (Schneider).

Head about  $5\frac{1}{4}$ ; depth about  $7\frac{2}{5}$ ; width of head about  $1\frac{7}{8}$  in its length; snout 3; eye-cavity 4; snout to front of mouth about  $2\frac{1}{8}$ ; width of mouth 3; interorbital space  $2\frac{2}{5}$ ; first dorsal spine 4; second dorsal spine  $4\frac{1}{8}$ ; least depth of caudal peduncle 6; pectoral 2 along front margin; length of ventral  $2\frac{1}{4}$ ; teeth  $\frac{4}{3}\frac{0}{0}$ ; length, dried, about  $33\frac{1}{4}$  inches. Italy? (Bonaparte, No. 42).

Also another example, dried, without data, probably same as above?

Dr. Doderlein included *Squalus uyato* Rafinesque<sup>17</sup> as a synonym of this species. From the latter's very rude figure,<sup>18</sup> though of course of little value, one would be obliged to retain it under *Squalus*.

*Etmopterus spinax* (Linnæus).

Head  $5\frac{1}{10}$  to  $5\frac{5}{8}$ ; depth about  $6\frac{1}{2}$  to  $9\frac{1}{8}$ ?; width of head  $1\frac{4}{7}$  to  $1\frac{1}{5}$  in its length; snout  $2\frac{1}{8}$  to  $3\frac{1}{8}$ ; eye 3 to 5 (iris); width of mouth  $2\frac{2}{5}$  to  $2\frac{3}{8}$ ; space between tip of snout and front margin of upper jaw  $1\frac{1}{5}$  to  $1\frac{9}{10}$ ; interorbital space  $2\frac{1}{5}$  to  $2\frac{2}{5}$ ; least depth of caudal peduncle  $5\frac{2}{3}$  to  $6\frac{1}{2}$ ; height of lower caudal lobe  $3\frac{2}{5}$  to  $3\frac{3}{8}$ ; pectoral  $1\frac{9}{10}$  to  $2\frac{1}{10}$ ; ventral  $1\frac{3}{8}$  to  $1\frac{5}{7}$ ; teeth  $\frac{3}{4}\frac{0}{0}$ ; length  $11\frac{1}{2}$  to  $16\frac{3}{8}$  inches. Italy (Bonaparte, No. 243). Three examples.

*Centroscyllium fabricii* (Reinhardt).

George's Bank (U. S. N. M.). A young example.

#### DALATIIDÆ.

*Dalatias licha* (Bonnaterre).

Head  $6\frac{1}{2}$ ; depth  $8\frac{2}{3}$  to 9; width of head  $1\frac{3}{5}$  to  $1\frac{7}{8}$ ; depth of head about  $1\frac{2}{3}$  to  $2\frac{2}{7}$ ; snout  $4\frac{1}{3}$  to  $4\frac{1}{2}$ ; eye, to edge of iris,  $6\frac{1}{3}$  to 7; space between tip of snout and front margin of upper jaw  $3\frac{2}{5}$ ; width of mouth  $2\frac{3}{4}$  to  $3\frac{2}{5}$ ; interorbital space  $2\frac{5}{8}$  to 3; length of first dorsal  $1\frac{1}{2}$  to  $1\frac{3}{5}$ ; length of second

<sup>17</sup> *Car. Nuov. Gen. Sicilia*, 1810, p. 13.

<sup>18</sup> *Squalus uyatus* Rafinesque, *l.c.*, Pl. 14, fig. 2.

dorsal  $1\frac{2}{3}$  to  $1\frac{2}{3}$ ; least depth of caudal peduncle 6 to  $6\frac{1}{2}$ ; height of lower caudal lobe  $2\frac{2}{3}$  to  $2\frac{2}{3}$ ; pectoral  $1\frac{1}{3}$ ; ventral, without clasper,  $1\frac{1}{10}$ ; length  $32\frac{1}{2}$  to  $33\frac{3}{4}$  inches. Italy (Bonaparte, No. 240). Two examples.

#### SQUATINIDÆ.

*Squatina squatina* (Linnæus).

Three from Italy (Bonaparte, No. 238); one from Bay of Naples (Dr. H. C. Chapman); large example without data.

Also three dried skins, without data.